

REMARKS

Claims 1-12, 24-33, 44-53, 64 and 66-69 are pending. Claims 13-23, 34-43, 54-63 and 65 have been withdrawn. The Office Action dated August 10, 2006 in this Application has been carefully considered. The above amendments and the following remarks are presented in a sincere attempt to place this Application in condition for allowance. Claims 1, 24, 44, 64, 66, and 68-69 have been amended in this Response. Reconsideration and allowance are respectfully requested in light of the above amendments and following remarks for those Claims not in condition for allowance.

Claims 1-12, 24-33, 44-53, 64, and 66-69 stand rejected under 35 U.S.C. §112 first paragraph for failing to comply with the written description requirement because the disclosure of two species, a MEMS and a micromachined device, is allegedly not sufficient to constitute the genus of the claimed “microscopic device.” Insofar as they may be applied against the Claims, these rejections are respectfully traversed. In addition to the MEMS and micromachined devices disclosed in the original specification, the Applicants also disclosed at least bolometers, micromechanical resonators, micromirror arrays, and RF MEMS switches. See at least page 10, lines 21-25. Further, the Applicants respectfully submit that MEMS and micromachined devices are known in the art and therefore require no further elaboration. Accordingly, the Applicant respectfully requests that the rejections be withdrawn.

Claims 24, 44, 66, and 69 stand rejected under 35 U.S.C. §112 second paragraph as being indefinite because there are allegedly no antecedent bases for “the movable regions.” In light of the amendments submitted herewith, the Applicant respectfully submits that the rejections have been overcome. Furthermore, Applicant contends that the rationale underlying this amendment bears no more than a tangential relation to any equivalence in question because the amendment

corrects typographic errors. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 122 S.Ct. 1831 (2002). Accordingly, the Applicant respectfully requests that the rejections be withdrawn.

Claims 24, 66, and 69 stand rejected under 35 U.S.C. §102(c) by U.S. Patent No. 6,441,481 to Karpman ("Karpman"). Insofar as it may be applied against the Claims, these rejections are respectfully traversed.

Rejected independent Claim 24 as now amended more particularly recites one of the distinguishing characteristics of the present invention, namely, "a method for packaging at least one microscopic device, comprising forming a housing with at least one aperture over the microscopic device, depositing a protective material adjacent at least a portion of the housing, wherein the protective material at least flows into at least one aperture of the housing, sealing the aperture and "is in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the microscopic device," and curing the protective material." (Emphasis added.) Support for this Amendment can be found, among other places, page 9, line 18 to page 10, line 11; Figure 1; and Figure 5, of the original Application.

Regarding Claim 24, Karpman was cited as assertedly fully disclosing the following: (1) a method for packaging at least one microscopic device comprising 2) forming a housing with at least one aperture over the at least one microscopic device 3) placing/depositing a liquid phase protective material ("pour", item 50; Col. 4, Lines 50-55) adjacent to at least a portion of the housing forming a protective layer on housing 4) wherein the protective material extends at least partially into at least one aperture (e.g. encapsulant material reaches substrate) 5) sealing the aperture 6) but does not extend into at least one of the movable regions and 6) allowing or causing the protective layer to harden/cure.

Karpman does not disclose an aperture of a housing over a microscopic device as set forth in Claim 24. Rather, Karpman describes an overmold 50 that protects the wire bond 40 and electrical connector 14 from external damage. The overmold 50 is typically an epoxy, filled with silica to reduce thermal expansion. It is poured in between the frit glass posts 22 and then hardens to cover and hold in place the electrical connectors 14. See column 4, lines 50-56. Furthermore, as Figures 14 and 15 reveal, the overmold is located between the frit glass posts associated with adjacent microstructures in contrast to being over a microscopic device. Thus, any aperture that the overmold extends into would have to exist between the frit glass posts and not over the microscopic device. Moreover, the Applicant respectfully submits that the purported aperture between the frit glass posts is not “of a housing” as Claim 24 requires. Thus, the Applicant respectfully submits that Karpman fails to disclose a housing with at least one aperture over a microscopic device.

In view of the foregoing, it is apparent that the cited reference does not disclose, teach or suggest the unique combination now recited in amended Claim 24. Applicant therefore submits that amended Claim 24 is clearly and precisely distinguishable over the cited reference in a patentable sense, and is therefore allowable over this reference and the remaining references of record. Accordingly, Applicant respectfully requests that the rejection of amended Claim 24 under 35 U.S.C. § 102(e) be withdrawn and that Claim 24 be allowed.

Applicant contends that the rejection of amended Claims 66 and 69 are overcome for at least some of the reasons that the rejection of Claim 24 as amended is overcome. These reasons include Karpman not disclosing, teaching, or suggesting “a housing with at least one aperture over the microscopic device.” (Emphasis added.) Applicant therefore respectfully submits that amended Claims 66 and 69 are clearly and precisely distinguishable over the cited references in any combination.

Claims 1-5, 7, 8, 10-12, 24-28, 30-33, 44-48, 50-53, 64, and 66-69 stand rejected under 35 U.S.C. §103(a) by U.S. Patent No. 5,427,975 to Sparks et al (“Sparks”) in view of U.S. Patent No. 5,869,356 to Fuller et al (“Fuller”). Insofar as they may be applied against the Claims, these rejections are respectfully traversed.

Rejected independent Claim 1 as now amended more particularly recites one of the distinguishing characteristics of the present invention, namely, “a method for packaging at least one microscopic device, comprising applying a sacrificial material to at least one microscopic device, applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material, creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material, removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains, depositing a protective material adjacent the housing of structural material overlaying at least one aperture of the housing and in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the microscopic device, and curing the protective material.” (Emphasis added.)

Regarding Claim 1, Sparks was cited as assertedly fully disclosing the following: (1) a method for packaging at least one microscopic device, comprising 2) applying a sacrificial material to at least one microscopic device, 3) applying a layer of structural material adjacent the sacrificial material, 4) the layer of structural material forming a housing adjacent at least a portion of the sacrificial material, 5) creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material, 6) removing the sacrificial layer, 7) wherein the housing of structural material with at least one aperture remains, and 8) depositing a protective material adjacent the housing of structural material overlaying at least one aperture of the housing.

Fuller was cited as assertedly fully disclosing applying the protective layer as a liquid and curing for an encapsulant. The Examiner further stated that it would have been obvious to combine the teachings of Sparks and Fuller in order to encapsulate the device as allegedly required by Sparks.

Sparks does not suggest, teach, or disclose a protective layer "in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the microscopic device". Specifically, Sparks suggests, teaches, or discloses a plasma silicon nitride film 54 that is deposited into the cavity 22. See Fig. 9d. Thus, the silicon nitride film more than fills the aperture. Indeed, because the plasma silicon nitride film ingresses the cavity it can potentially interfere with the movable regions of the sensor. Moreover, because the plasma silicon nitride film ingresses the cavity it represents a potential source of particles therein. Since the protective material of the claimed invention prevents the ingress of particles into the housing (see page 10, lines 14-20) and does not wick into the movable regions of the device sufficiently to interfere with operation of the microscopic device(see page 10, lines 6-11) the claimed invention provides unexpected results over Sparks. Indeed, because the plasma silicon nitride film of Sparks ingresses the cavity, Sparks teaches away from a protective material which in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the microscopic device". Therefore, Sparks cannot be used to render Claim 1 obvious.

Furthermore, Fuller not only fails to remedy these deficiencies of Sparks but Fuller also teaches away from the present invention. More specifically, Fuller states that "unfortunately, because of the "small" dimensions, the nature of the encapsulant, and the surface of the solder mask, the extent of the flow of the encapsulant cannot be precisely controlled. Thus, it may flow and properly cover the bond pads and the exposed circuit wiring, but stop short of any of the BGA pads

as shown on the left side of FIG. 4. However, it may flow farther..." See column 4, lines 19-26. Accordingly, the encapsulant described by Fuller would either fail to flow into the aperture or flow into the protective cavity thereby rendering the sensor inoperative. Moreover, because the flow cannot be controlled, Fuller teaches away from a protective material deposited "in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the microscopic device" as set forth in Claim 1.

In view of the foregoing, it is apparent that the cited references do not disclose, teach or suggest the unique combination now recited in amended Claim 1. Applicant therefore submits that amended Claim 1 is clearly and precisely distinguishable over the cited references in a patentable sense, and is therefore allowable over these references and the remaining references of record. Accordingly, Applicant respectfully requests that the rejection of amended Claim 1 under 35 U.S.C. § 103(a) be withdrawn and that Claim 1 be allowed.

Claims 2-5, 7, 8, and 10-12 depend on and further limits Claim 1. Hence, for at least the aforementioned reasons, these Claims should be deemed to be in condition for allowance. Applicant respectfully requests that the rejection of the dependent Claims 2-5, 7, 8, and 10-12 also be withdrawn.

Applicant contends that the rejection of Claims 24-28, 30-33, 44-48, 50-53, 64, and 66-69 are overcome for at least some of the reasons that the rejection of Claim 1 as amended is overcome. These reasons include the proposed combination of Sparks and Fuller not disclosing, teaching, or suggesting a protective material deposited "in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the microscopic device". (Emphasis added.) Applicant therefore

respectfully submits that Claims 24-28, 30-33, 44-48, 50-53, 64, and 66-69 are clearly and precisely distinguishable over the cited references in any combination.

Claims 6, 29, and 49 stand rejected under 35 U.S.C. §103(a) by Sparks and Fuller and further in combination with U.S. Patent No. 5,366,906 to Wojnarowski et al (“Wojnarowski”).

Claims 6, 29 and 49 depend on and further limit through intermediate dependent claims, Claim 1, 24 and 44, respectively. Hence, for at least the aforementioned reasons applicable to Claims 1, 24 and 44, discussed above, which Wojnarowski does not remedy, these Claims should also be deemed to be in condition for allowance. Applicant respectfully requests that the rejection of the dependent Claims 6, 29 and 49 also be withdrawn.

Claim 9 stands rejected under 35 U.S.C. §103(a) by Sparks in combination with U.S. Patent No. 6,214,640 to Fosberry et al (“Fosberry”). Insofar as they may be applied against the Claim, this rejection is respectfully traversed.

First, it is noted that Claim 9 depends on and further limits, through intermediate dependent claims, Claim 1. Hence, for at least the aforementioned reasons applicable to Claim 1, which Fosberry does not remedy, Claim 9 should also be deemed to be in condition for allowance. Applicant respectfully requests that the rejection of the dependent Claim 9 also be withdrawn.

Applicant has now made an earnest attempt to place this Application in condition for allowance. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of Claims 1-12, 24-33, 44-53, 64, and 66-69.

Applicant hereby requests an extension of time for making this reply and hereby authorizes the Commissioner to charge the required fee of \$510.00, under 37 C.F.R. 1.17(a)(3), to Deposit Account No. 50-0605 of CARR LLP. Applicant does not believe that any other fees are due; however, in the event that any other fees are due, the Commissioner is hereby authorized to charge any required fees due (other than issue fees), and to credit any overpayment made, in connection with the filing of this paper to Deposit Account No. 50-0605 of CARR LLP.

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, the Examiner is invited to telephone the undersigned at the number listed below.

Respectfully submitted,

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